SAS Users of New Zealand
SAS 9.4 WHAT'S NEW IN THE PLATFORM

- Platform update
- SAS Grid Computing update
- Hadoop support
- High Performance Analytics (HPA) update
- Deployment patterns
SAS 9.4
CORE THEMES

Enable
Provide quick, precise answers; reduce time to value

Simplify
Remove barriers of analytical knowledge and complexity; reduce risk

Innovate
Make analytics approachable and easy to integrate; support collaboration

Deployment Choices
- On-premises
- Hosted
- Cloud
SAS 9.4 PLATFORM UPDATE

- SAS Metadata Server
- SAS Middle-Tier
- SAS Environment Manager
- Base/Foundation SAS enhancements
  - Security
  - Web Infrastructure Platform Data Server
  - ODS, DS2…
  - Hadoop
What is a Metadata Server Cluster?
- Coordinated set of connected metadata servers
- Appear as a single standard metadata server to clients

Benefits of Metadata Server Clustering
- Provide failure recovery for high availability
- Provides scalable performance for large deployments
A cluster is three or more metadata server nodes.

Each node is a full metadata server with a complete copy of all metadata.

One node is designated the master to coordinate the cluster.

All other nodes are slave nodes.

Clients connect to slave nodes.

Once connected it looks like a standard single server to the client.
SAS WEB APPLICATION SERVER

Reduce Cost
- Removal of third party application server requirement and associated costs
  - Software + Support

Reduce Complexity
- Simplified Support – SAS provides enterprise-level support of your entire SAS deployment
  - Simplified deployment and non-disruptive maintenance

Expand Management Capabilities
- Increased ability to monitor and manage SAS servers, solutions and users

Deliver Higher Availability
- Alternative to Remote Services
- Automated Clustering Support

Deploy cloud-enabled SAS platform
Benefits of being “embedded”

- No additional cost
- Automated deployment
- Default clustering support
- Built-in integration support
- Non-disruptive maintenance

Good Fit with Virtualization and Cloud Technologies

Everything you need to build and run web and cloud applications is included in the box!
FEATURES

Automated Deployment
- SAS Web Server
- SAS Web Application Server
- SAS Web Applications
- Middle Tier Clustering

Built in support for
- Proxy server integration
- Security Integration
- Load Balancer Integration

Single Point of Support for SAS Middle Tier

Tuning Guide for SAS Middle Tier

SAS Middle Tier Scripting Framework
SAS ENVIRONMENT MANAGER

- Embedded operational monitoring solution
- Proactive monitoring of platform health and availability
- Agent based, auto-discovery of resources
- Monitoring of log events and configuration changes
- Alerting and actions
SAS Environment Manager

### Overview

#### Availability Summary Overall

<table>
<thead>
<tr>
<th>Resource Type</th>
<th>Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAS Metadata Server 9.4</td>
<td>1</td>
</tr>
<tr>
<td>SAS OLAP Server 9.4</td>
<td>1</td>
</tr>
<tr>
<td>SAS Object Spawner 9.4</td>
<td>1</td>
</tr>
</tbody>
</table>

Updated: 11:01 AM

#### Availability Summary Middle-Tier Components

<table>
<thead>
<tr>
<th>Resource Type</th>
<th>Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apache Tomcat 6.0</td>
<td>1</td>
</tr>
<tr>
<td>PostgreSQL 9.x</td>
<td>1</td>
</tr>
<tr>
<td>SpringSource tc:Runtime 7.0</td>
<td>1</td>
</tr>
<tr>
<td>jFabric Web Server 5.2</td>
<td></td>
</tr>
</tbody>
</table>

Updated: 11:01 AM

#### Availability Summary Spawnable SAS Servers

<table>
<thead>
<tr>
<th>Resource Type</th>
<th>Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAS Object Spawner 9.4, SAS Logical Pooled Workspace Server</td>
<td>1</td>
</tr>
<tr>
<td>SAS Object Spawner 9.4, SAS Logical Stored Process Server</td>
<td>1</td>
</tr>
<tr>
<td>SAS Object Spawner 9.4, SAS Logical Workspace Server</td>
<td>1</td>
</tr>
</tbody>
</table>

Updated: 11:01 AM

### Metric Viewer WebApp Login Response Time

<table>
<thead>
<tr>
<th>Metric Name</th>
<th>Response Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>HTTP</td>
<td>1ms</td>
</tr>
<tr>
<td>BI Dashboard</td>
<td>1ms</td>
</tr>
<tr>
<td>SAS Login</td>
<td>1ms</td>
</tr>
<tr>
<td>Stored Process</td>
<td>1ms</td>
</tr>
<tr>
<td>Web Report Studio</td>
<td>1ms</td>
</tr>
</tbody>
</table>

Updated: 11:01 AM

### Metric Viewer SASWork Disk Space

<table>
<thead>
<tr>
<th>Metric Name</th>
<th>Use Percent</th>
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</thead>
<tbody>
<tr>
<td>SAS Home Directory 9.4 SAS Directory</td>
<td>7.0%</td>
</tr>
</tbody>
</table>

ptnode20.piest.sas.com: SAS Home Directory 9.4 SAS work directory

Updated: 11:01 AM

### Recent Alerts

<table>
<thead>
<tr>
<th>Data / Time</th>
<th>Alert Name</th>
<th>Resource Name</th>
<th>Fixed</th>
<th>Ack</th>
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</thead>
<tbody>
<tr>
<td>06/20/2013 09:08 AM</td>
<td>Server Launch</td>
<td>pnode20.piest.sas.com Object</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>06/20/2013 09:22 AM</td>
<td>TCP/IP Support Routine Failure</td>
<td>pnode20.piest.sas.com Object</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>06/20/2013 12:20 AM</td>
<td>Server Launch</td>
<td>pnode20.piest.sas.com Object</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>06/20/2013 09:56 PM</td>
<td>Connection</td>
<td>pnode20.piest.sas.com SAS ...</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>06/20/2013 09:19 PM</td>
<td>Server Launch</td>
<td>pnode20.piest.sas.com Object</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

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ARCHITECTURE OVERVIEW

Platform 1 (machine 1):
- Mid-Tier Servers
- Object Spawner
- Agent
- Management Server
  - GUI Administration, Provisioning, Groups, Metrics, Alerts, Events, Logs, Agents

Platform 2 (machine 2):
- Metadata server
- Object Spawner
- Agent
- Management Server
  - CMDB Service
    - Database
    - Inventory, Events, Alerts

CLI
- Open API
- RESTful

Web GUI
- Dashboard
- Control Center

Upgradeable via plug-ins
SECURITY

Lock-down
• Restrict access to only those host paths and files that are included in that server’s list of permitted resources
  NOTE: Lock-down is not fully supported by all SAS tools and solutions.

Metadata-bound libraries
• Universally enforce metadata-layer permission requirements for physical tables—regardless of how a user requests access from SAS

SAS/SECURE
• Automatically delivered with Base SAS at no additional cost*

Advanced Encryption Standard (AES) with SAS/SECURE
• Encrypt SAS data on disks

* United States export regulations on encryption software restrict access to SAS/SECURE software and related technical data.
http://sws.sas.com/pub/Onlinedoc/v8-0/prod/sashtml/shr/z0354312.htm
SAS 9.4 PLATFORM UPDATES

- **SAS 9.4 added support:**
  - Java 7
  - RDBMS- POSTGRES (Web Infrastructure Platform Data Server)
  - Windows 8, Windows 8.1
  - Windows Server 2008 SP2
  - Google Chrome Web Browser
  - Internet Explorer 11 (IE11) - on Windows 7, Windows 8, Windows 8.1

- **SAS 9.4 does not support:**
  - Framework Data Server (Firebird)
  - HP-UX PA-RISC (per HP’s lifecycle)
  - Linux 32-bit

- No direct migration from SAS 9.1.3 to SAS 9.4
- SAS 9.4M1 is available now!
NEW OUTPUT DELIVERY SYSTEM (ODS) - DESTINATIONS

**ODS EPUB** - Create SAS reports as e-books that can be read with Apple iBooks e-book reader on iPad and iPhone.

**ODS POWERPOINT** – Create Microsoft PowerPoint slides that combine text and SAS reports.

**ODS HTML5** – Create HTML5 output for SAS reports to support delivery to any web browser that is HTML5-compatible.
SUMMARY OF NEW FEATURES

- GRID OPTION SETS
- Workspace Servers launched using the grid
- Logging facility
- SASGSUB enhanced wait
Specific users
Using specific applications
Needing specific grid options

+ 

One set of grid options per SAS application server context

= 

Multiple SAS application server contexts
SAS 9.3 Example

Diagram showing a network of directories and files, including directories named 'SASMeta', 'Finance', 'Risk', 'FinanceDIS', 'RiskDIS', 'FinanceGSUB', 'RiskGSUB', 'TestDIS', 'TestGSUB', 'FinanceEG', 'RiskEG', and 'TestEG'.

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SAS 9.4

GRID OPTION SETS

Risk

SAS Options:
-memsize 256
Resources:<none>
Grid Options: queue=normal

SASGSUB OPTIONS
SAS Options: -memsize 0
Resources: GSUB
Grid Options: queue=night

Finance

SASGSUB
OPTION SETS

THE SAME DEPLOYMENT IN 9.4

Using Grid Options Sets
OPTION SETS | LOGICAL GRID SERVER DEFINITION

Provider: Platform
Grid Command: C:\SAS94\Grid\Lev4\SASApp\GridServer\sasgrid
Optional Fields:
SAS Options: -memsize 256
Required Resources: SASApp
Grid Options: queue=normal

Grid Options Set Mappings:

<table>
<thead>
<tr>
<th>#</th>
<th>SAS Application</th>
<th>Mapped Identities</th>
<th>Grid Options Set</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SAS Data Integration Studio</td>
<td>Risk; Finance</td>
<td>DI Studio Grid Options</td>
</tr>
<tr>
<td>2</td>
<td>SAS Enterprise Guide</td>
<td>EG Users</td>
<td>EG Grid Options</td>
</tr>
<tr>
<td>3</td>
<td>SAS Grid Manager Client Utility</td>
<td>Finance; Risk</td>
<td>GSUB Grid Options</td>
</tr>
</tbody>
</table>

Default options
SAS GRID WORKSPACE SERVERS LAUNCHED

SAS 9.3 Implementation

SAS 9.4 Implementation

EG

WORKSPACE SERVER

EG/AMO Grid Macros

GRID

GRID SERVER

EG

GRID

WORKSPACE SERVER
SAS SUPPORT

- Support for Cloudera and HortonWorks
  - Cloudera CDH 4.1.2, Hortonworks HDP 1.3 or 2.0
- SAS/ACCESS to Hadoop
  - Basic FILE/INFILE connectivity
  - LIBNAME (DATA= and OUT= connectivity)
  - PROC HADOOP
- SAS/ACCESS to Cloudera Impala
- Scoring accelerator
- Code accelerator
- HPA
- SPD Engine with Hadoop

Cloudera Impala is an open source Massively Parallel Processing (MPP) query engine that runs natively on Apache Hadoop.
HADOOP

SAS WITH HADOOP ECOSYSTEM

SAS User Interface

Metadata

Data Access

Data Processing

File System

SAS® Enterprise Guide®

SAS® Data Integration

SAS® Enterprise Miner™

SAS® Visual Analytics

SAS Metadata

Base SAS & SAS/ACCESS® Interface to Hadoop™

In-Memory Data Access

HBase

Pig

Hive

MapReduce

HDFS

SAS® LASR™ Analytic Server & SAS® High-Performance Analytics

MPI Based

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Use SPD Engine with Hadoop

• Read, write, and update data through the Hadoop Distributed File System (HDFS).
• Submit configuration properties to the Hadoop server.

Why it matters

• Customers can take advantage of the benefits of Hadoop HDFS to store and access SAS data sets stored across their Hadoop clusters.
SAS HPA ENHANCEMENTS

- New product bundles
  - SAS High-Performance Statistics
  - SAS High-Performance Data Mining
  - SAS High-Performance Text Mining
  - SAS High-Performance Forecasting
  - SAS High-Performance Econometrics
  - SAS High-Performance Optimization

- Two operating modes
  - SAS High-Performance Analytics “Alongside” mode
  - SAS High-Performance Analytics “Next to” mode

- No longer need a dedicated appliance, “HPA Appliance”
  - Asymmetric (“next to” mode) and SMP HPA Procs
SAS HPA

ASYMMETRIC MODEL

Asymmetric Data Loading direct into SAS In-Memory from Databases

“SAS Rack”

SAS In-Database embedded processing engines –
- For pulling data into the SAS HP Analytics nodes (directly through Asymmetric loading or indirectly using Hadoop as caching layer)
- Improved features for processing large data volume
- Used also for deploying models directly into Database for operational use

CLIENT

HADOOP
GREENPLUM
TERADATA
ORACLE Exadata

SAS Users of New Zealand
• Shared environment for all users (analytics and VA)
• Distributed and non-distributed VA
• SAS Grid and non-grid environments
• SAS High Performance Analytics
From SAS 9.4 it has been possible to have a truly shared platform. Distributed HPA proc execution supports RHEL and SUSE – so only applies to SAS Grids on RHEL and SUSE.

* Non-distributed or SMP VA is supported on Linux and Windows.
SAS VISUAL ANALYTICS 6.2+ AND SAS (E)BI SERVER
SHARED METADATA SERVER FOR 9.4 ENVIRONMENT ONLY

HIGH LEVEL ARCHITECT

SAS® VISUAL ANALYTICS ENVIRONMENT

VA Server (LAX)
Mid-Tier (SAS App Server)
Workspace Server

LASR Cluster
SAS® LASR Analytic Server
Co-Located Data Storage

Shared Metadata Server
Metadata Server

SAS (E)BI Middle Tier Server (LAX* recommended)
Mid-Tier (SAS App Server)

(*) non-distributed VA can also be deployed on Windows

SAS (E)BI Compute Server
Workspace Server
Stored Process Server
OLAP Server

VA CLIENTS
- Desktop
- Web
- Mobile

EBI CLIENTS
- Desktop
- Web

SAS® LASR Analytic Server
Hadoop
RDBMS
Nonrelational
ERP
Click Stream
PC Files

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Questions
THANK YOU